DIABETES MELLITUS IN CERTAIN CITIZENS OF ROBESON COUNTY – TREATMENT EFFICACY DIFFERENCE BETWEEN SEXES

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INTRODUCTION

How do you define health? The term health is often defined in reference to what physicians have confirmed and most often from one's personal view of themselves. Most people say they are in "good health" or that they eat healthy, never thinking about what this term actually means. The World Health Organization defines health in terms of complete physical, mental, and social wellness, not only the absence of disease or illness (Basch, 1990). Thus, there is no real, acceptable definition for health (Basch, 1990).

The term health can conform to different meanings depending on an individual's cultural perspectives. Different cultures define health in various terms relating to pain, symptoms of illness, and biological interference from stress, the weather, and / or normal daily activities (Basch, 1990). This is why "health is clearly an issue of importance to individuals, groups, and governments" collectively for the wellness of societies around the world (Basch, 1990, p.32). In Sweden for example, the health care system is "organized and provided by the public sector" (Socialstyrelsen, 1993, p.73). Swedes tend to implement a more specialized plan of diagnosis and medical treatment to ensure their health as a group of people. From an international perspective, health depends on the socioeconomic issues, political and cultural aspects from which it is derived (Basch, 1990).

Culture has a profound influence on an individual's lifestyle. "Culture is a group's design for living, a shared set of socially transmitted assumptions" about life and how to cope with it (Basch, 1990, p.75). "Everyone is immersed in his or her local culture. Unfortunately though, many culturally influenced behaviors can have significant health consequences" (Basch, 1990, p.76). Of the almost infinite number of health problems concerning the world today, many are the result of our individual lifestyles. *Webster's New World Dictionary* defines lifestyle as a person's whole way of living embedded into their culture (Guralnik, 1980). Take the American lifestyle for instance. Typically fast paced and demanding, it involves daily routines of back-to-back scheduling for work, family, and any unexpected events which often occur.

As one of the world's largest nations, America is also very multi-cultural because of the collage of different groups and races of people living here. Among these races and groups of people having their own culture, they have been studied, and continue to be because of the large prevalence of certain health problems such as heart disease and diabetes among different ethnic groups. Native Americans, African Americans, and Hispanics tend to have a higher prevalence for diabetes than among other groups. One might ask the question why, but the answer is still unknown. Researchers believe, however, that it does stem from cultural and lifestyle factors involving traditional foods and food preparation, as well as shifting into more sedentary lifestyle habits. Even though it is difficult to ignore our cultural and sometimes, innate customs, it is of great importance to recognize and increase the awareness of unhealthy lifestyle habits within a culture. By recognizing and eliminating these unhealthy lifestyle habits, you have not changed your culture; you have rather improved your lifestyle by possibly decreasing the risks for developing many chronic health problems.

Think about it. Self-improvement first involves a conscious concern for ourselves. However, when we are concerned about our health, we are also aware of the changes that need to be made toward a healthier lifestyle and ultimately self-improvement. Proper diet and exercise are two major determinants of a healthy lifestyle. A person's diet, consisting of the foods he or she normally eats, plays an important role in their lifestyle. Food is more than just a source of nutrition; it is a way of life (Helman, 1994). Food is a source of cultural expression "deeply embedded in the social, religious, and economic aspects of everyday life" (Helman, 1994, p.37). Diet however, consists of more than just the foods we eat. A person's diet is a combination of elements, ranging from the different types of food we consume, the amount of each type consumed, how they are prepared, to even the time they are consumed. A proper diet is considered to be a balanced diet, most often referred to as containing foods from all four food groups: bread and cereal, fruits and vegetables, meat and protein, and fats. The average American diet is not a balanced diet because of the lack of and/or too much from one food group, ultimately causing health problems.

Adequate physical activity also ensures the maintenance of a healthy lifestyle. Unlike diet, exercise is based on an individual's want and need to improve their overall health in conjunction with a proper diet. Regular exercise is beneficial to our overall health as a leisure activity aside from our daily routines. Whether it is biking, jogging, swimming, or simply walking, activities such as these can relieve stress, help maintain healthy body weight, and increase metabolism for efficient uptake of nutrients as well as many other important benefits. For so many people it is hard to incorporate a regular exercise routine into our busy schedules. However, incorporation of healthy lifestyle practices such as regular exercise is equally as important as a proper diet in order to achieve self-improvement. This finally brings us to the reason why these issues influence health so greatly-- as a means to prevent diseases.

Disease is vaguely defined as "illness in general" or "a particular destructive process in an organism" (Guralnik, 1980, p.133). Furthermore, a disease is not merely an entity defined by medical terminology. Diseases are more defined by the continual observations made by specialist trying to discover their causes and contributory factors (Basch, 1990). When talking about diseases, one often discusses the possible reasons for their occurrence. Causes for disease are complex. The prevalence of diseases now, worldwide are due to changes from a traditional to a more "westernized" lifestyle (Helman, 1994). Coronary heart disease and diabetes have become more prevalent in the past century due to dietary changes (Helman, 1994). Fat consumption has increased almost 50 percent, the amount of sugar consumed has doubled, and unfortunately, the quantity of fiber consumed in the diet has markedly dropped (Helman, 1994, p.60). Dietary changes alone have increased the risk for developing various diseases. Nevertheless, as stated previously, regular exercise can reduce these risks, as well as improve overall health regardless of age, race, or creed. Certain types of diseases require a change in lifestyle. These changes are combined diet and exercise with types of medications as the prescribed method of treatment. Diabetes for instance, "like most chronic diseases, is multi-factorial" (Gafvels, 1997, p.7).

Simply to say, that it is a disease determined by multiple causes specific to each individual affected, therefore dependent on a specific method of treatment designed for each individual. As William Osler expresses in a study on insulin-treated diabetes in Swedes, "sometimes it is more important to know what kind of person it is that has a disease, than to know what kind of disease a person has" (Gafvels, 1997, p.2).

AIM OF STUDY

Diabetes Mellitus in Certain Citizens of Robeson County -- Treatment Efficacy Difference between Sexes

In researching the disease Diabetes Mellitus, the aim of this study focuses specifically on Non-Insulin Dependent Diabetes Mellitus (NIDDM). The purpose is to gain a clearer understanding about NIDDM, its increasing prevalence among Native Americans, and primarily how improving such lifestyle factors as diet and exercise, in combination with diabetes medications are implemented as treatment methods to ascertain their benefits for patients in controlling this disease.

QUESTIONS AT ISSUE

- What is Diabetes Mellitus? (Types, terms, symptoms, statistics, etc.)
- What is the average age for diagnosing NIDDM?
- What are the leading causes for the development of NIDDM?
- What is the prevalence of NIDDM in the United States, North Carolina, and Robeson County?
- Why is the prevalence of NIDDM highest among minorities?
- What is the prevalence of NIDDM among American Indians of Robeson County?
- Which method(s) of treatment is (are) more effective?
- Are men or women more compliant to their prescribed method of treatment?
- What are some of the ways to educate people in general about diabetes and how to reduce the risks for development?
- What are some of the ways to educate people with diabetes about their condition and how to control it?

METHOD

Based on the criterion for a successful completion of the University of North Carolina at Pembroke (UNCP) Chancellor's Scholars Program, preparation for this study began while studying abroad in Vaxjo Sweden, spring of 1998. As a requirement for the course, Health Care in an Intercultural Perspective, preliminary research from literary sources exposed a tremendous amount of information and possible topics for further study. While performing field studies in Vaxjo on the subject diabetes and lifestyle, many questions were answered and many possible questions for study were derived from the information attained. Continual research using the World Wide Web and various search modes specific to health and diabetes, lead to personal inquiries with UNCP faculty, Dr. Ronny A. Bell of Wake Forest University Bowman Gray School of Medicine, Department of Public Health via e-mail, and primarily family friends and relatives affected directly or indirectly by diabetes mellitus. Other major resources for this study involved interviewing two health care professionals, a Physician Assistant and a Registered Nurse certified in diabetes education, who are familiar with the lifestyle and minority population affected with Type II diabetes in Robeson County in general.

For the purpose of this study, a three page survey instrument was developed using similiar question formats from the North Carolina Behavioral Risk Factor Surveillance System and the Lumbee telephone survey used in a study being conducted by Dr. Ronny Bell. Questionnaires were designed to address dietary components and physical activity, in order to survey both diabetic and non-diabetic persons. Questions were asked for general information such as age, sex, and race in order to eliminate unwanted variables. They also addressed specific information asking if the person has diabetes, if so, how is it being treated, and other health problems they might have. (Refer to Survey Questionnaire - Appendix II)

Over 100 surveys were randomly distributed throughout the town of Pembroke, North Carolina and local communities.

By way of personal contact in area churches, schools, doctors' offices, the UNCP campus, and various locations, predominantly Native American, over a period of one month, sixty-six surveys were collected. Surveying was specific to Native American residents age 45 - 60 plus or minus three years, using non-diabetic respondents as a control group. Age however is not a measured variable for this study.

Information from resources is used in approximately one half of this study as background and current facts for supporting data. Analysis of data from the surveys was performed using Epi Info computer programs "developed at the Centers for Disease Control and Prevention in collaboration with the Global Program on AIDS, World Health Organization" (Alperin and Miner, 1997, p.8). Compiling and writing this study follows the scientific method with assistance from faculty advisors Velinda Woriax Ph.D., Assistant Professor in Biology and Rudy Williams Ph.D., Professor in Communicative Arts. Personal interviews reflect the opinions of the health care professionals, however research results presented in this study confirm their perception.

(Refer to Appendix II, III, for survey and interview questionnaires)

RESULTS

What Is Diabetes Mellitus?

The earliest known record of diabetes dates back to 1552 BC. On third Dynasty Egyptian papyrus, physician Hesy - Ra as a symptom mentions polyuria (frequent urination). Up to the eleventh century, diabetes was commonly diagnosed by 'water tasters', who drank the urine of those suspected of having diabetes. The urine was thought to be sweet tasting, thus deriving from the Latin word 'mellitus' for honey, added to the term diabetes meaning something passing through like sugar or "honey"-- diabetes mellitus (CDA, 1998). But not until 1959 was diabetes classified in two major types; Type I (Insulin - Dependent)(IDDM) and Type II (Non-Insulin - Dependent)(NIDDM) diabetes mellitus (CDA, 1998). Today there are an estimated 123 million people worldwide who have diabetes. Some experts predict this number will grow to 220 million by the year 2010, making it a world wide, public health problem (Zimmet, 1998).

Diabetes Mellitus is a metabolic disorder that indirectly affects the body's ability to use digested foods for energy (NIH, 1995 and 1992). Diabetes does not interfere with digestion, but it does interfere with the body's absorption of glucose (NIH, 1995, 1992). Glucose is a simple sugar, used as the body's main source of fuel. Normally the cells utilize glucose when the hormone insulin is present. Insulin is produced by the pancreas in response to increasing blood glucose, which allows body tissues to metabolize it for energy (NIH, 1995, 1992). When this process does not work correctly, as in people having diabetes, glucose accumulates in the blood, spilling in the urine, being excreted from the body, and ultimately resulting in a lose of the body's main energy source (NIH, 1995, 1992). Currently there are four known types of diabetes. Types II and I mentioned previously are the most common forms diagnosed. Type I (Insulin - Dependent diabetes mellitus), formerly called juvenile-onset, is considered an autoimmune disease. This form of diabetes usually begins during childhood or adolescence, resulting from the immune system's attack on the insulin-producing beta cells in the pancreas (NIH, 1992, 1995).

Daily injections of insulin are required to live without serious complications. Type I diabetes is most prevalent among whites, accounting for about 5 - 10 percent of the population in the United States (ADA, 1998). Surprising data from the World Health Organization reports that "Type I is rare among Asian, African, and Native American populations" (NIH, 1995). On the other hand, northern European countries such as Finland and Sweden have very high rates (NIH, 1995). Researchers believe that cold weather might be one trigger, because Type I is more common in places with cold climates (ADA, 1997). A third form of diabetes is called gestational diabetes because it occurs during pregnancy. " A small percentage of women who become pregnant frequently develop high blood glucose levels usually after week 24" (Hollander and Pratt, 1985). This type of diabetes usually disappears after the pregnancy, but can increase the risk for developing Type II diabetes later in life (NIH, 1995). There are other rare types of diabetes, in which Dr. Graeme Bell of the Howard Hughes Medical Institute has identified. Three genetic mutations have been discovered causing a fourth form called Maturity-Onset Diabetes of the Young (MODY) (Bell, 1998). MODY usually occurs before age twenty-five, and is a Non-Insulin-Dependent type. Of the most common form of diabetes, Type II (NIDDM) is also the most prevalent. Type II and NIDDM are interchangeable terms. The remainder of this study will focus on Non-Insulin-Dependent diabetes mellitus using the abbreviation NIDDM.

NIDDM like Type I and gestational diabetes still results from the improper metabolism of glucose and in some cases/ little to no insulin production. But this type of diabetes is quite different depending on the individual it affects. The symptoms of diabetes are basically the same for all types. "They usually include fatigue, frequent urination, extreme thirst, (due to loss of fluids), sudden weight loss, blurred vision, slow healing of infections, and some women may experience genital itching" (NIH, 1992). It is important to remember that with NIDDM, these symptoms can develop gradually and may be hard to identify at first. The gradual onset of these symptoms usually occur in adults over age forty and is most prevalent over age fifty-five (NIH, 1995).

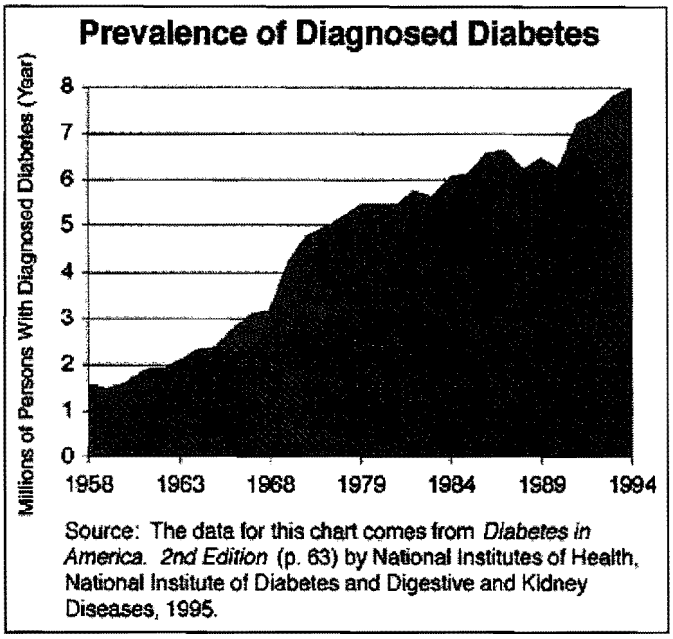

Figure 1-1: Source: Diabetes Overview, NIH, 1995

It is not yet clear as to what the actual causes for NIDDM are and why the prevalence is so high. Non-Insulin-Dependent diabetes has a "very high association with over nutrition and being overweight (approximately 80 percent of patients) (NIH Consens, 1986). Over nutrition means the consumption of large amounts of sugars and fatty foods causing weight gain (NIH, 1992). Continual weight gain, resulting in obesity, is believed to be one of the leading causes for the development of NIDDM, but scientists do not fully understand why (NIH, 1992). However, "the cornerstone of NIDDM therapy is a lifestyle centered around diet and supplemented, if needed, by insulin or oral agents" (NIH Consens, 1986). Lifestyle factors and a family history are also strong risk factors for developing NIDDM. Americans and Europeans eat too much fat and not enough carbohydrates and fiber, and they also do not get enough exercise (ADA, 1997). NIDDM diabetes also has a strong genetic basis, in that it "runs in families".

Even though "age, sex, weight, physical activity, diet, lifestyle, and family health history all affect a person's chances can be made to improve poor lifestyle habits, such as physical activity and diet which will enhance weight control (NIH, 1992).

By enhancing weight control, with increased physical activity and eating the proper diet, it could be possible to enhance insulin production, which would decrease blood glucose levels. Unfortunately though, "a major cause of NIDDM is insulin resistance, due to a defect in insulin receptors on cells causing them not to respond to insulin signals to metabolize glucose (NIH, 1992). In these cases, depending on how sever the insulin resistance is, prescribed methods of treatment work best.

Non-Insulin Dependent Diabetes Mellitus -- The Prevalence:

- United States Statistics

The American Diabetes Association released the latest statistics in 1998.

> Of the "15.7 million Americans who have diabetes, an estimated 10.3 million have been diagnosed. 5.4 million still are unaware that they have this disease. Type II diabetes accounts for 90 - 95 percent of the diagnosed cases. It is the 6th leading cause of death in the United States. Diabetes is the leading cause of adult blindness, end stage kidney disease, and lower-limb amputations. People with diabetes are three times more likely than non diabetics to suffer heart attack or stroke"

(ADA, 1998).

- North Carolina Statistics

> " In 1994, reported medical examiner (ME) cases of death from diabetes were conducted to determine the number and characteristics of these cases. Approximately 1,597 North Carolina residents died in 1994 from this disease. NIDDM accounts for approximately 17.2% of all deaths of person's age 25 and older. The mean patient age at death for all cases was 42 years (range, 35 years to 57 years). Of the 42 cases ascertained from ME records in this study, 6 were previously undiagnosed"

(Bell, Butts, Howard, Lengerich, Norman, 1994).

- Robeson County Statistics

  Diabetes mortality in Robeson County contributes to about 46.1 deaths per 100,000 residents compared to 22.2 for the state. Robeson County ranked number 1 in the state for diabetes mortality between 1992-1996. With an estimated population of 112, 005 residents 4,987 age 20 and older are estimated to have diabetes. Of the 4, 987 total estimated diabetic population, 3,737 were non-white" particularly Native American, African American, and other.

(NC State Health Statistics, 1996-1997)

Robeson County also ranks, "**2nd** for diabetes-related amputations, **3rd** in cardiovascular disease as a principal diagnosis with diabetes as a secondary diagnosis, **6th** for diabetes as a principle or secondary diagnosis, **7th** for diabetes-related renal dialysis/ transplantation in comparison to all other North Carolina counties based on 1997 diabetes related hospitalization data"

(NC State Health Statistics, 1996-1997).

Prevalence Among Native Americans and why:

"Native Americans have the highest rates of diabetes in the world (NIH, 1995). Non-insulin-dependent diabetes mellitus is an epidemic in Native American communities, occurring primarily in the second half of this century (NIH, Gohdes, 1995, p.683). The genetic component of NIDDM has the highest rates in full-blooded Native Americans, having increasing prevalence "as traditional lifestyles have been abandoned in favor of westernization with accompanying increases in body weight and diminishing physical activity" (NIH, Gohedes, 1995,p 683). What is known about NIDDM among Native Americans in North America is related to studies of the Pima Indians in Arizona. Studies show the relationship of obesity to subsequent diabetes "is present in all Native American populations" (NIH, Gohdes, 1995, p. 683).

Limited data actually exists for all Native American populations. Then this also excludes tribes like the Lumbee Indians of Robeson County who are yet to be federally recognized.

Therefore, as Native Americans continue to be "disadvantaged both economically and educationally compared with the general U. S. population", we are also disadvantaged in health care programs, which could begin to increase the awareness of the prevalence of diabetes as a growing problem. Unfortunately it is unknown completely as to why the prevalence of NIDDM is highest among native Americans, but research is underway.

Prevalence of NIDDM among Native Americans of Robeson County?

Again, unfortunately this question can not officially be answered. But according to Mary Black, Ph.D., manager of Wellness Services at Southeastern Regional Medical Center in Lumberton, North Carolina, currently there is no breakdown for Native Americans recognized for prevalence singly. The statistics for Robeson County sited previously focuses on diabetes prevalence among whites and non-whites. Robeson County is however tri-racial among Native Americans – 38%, African Americans – 30%, Whites and Other – 32% (MARC, UNCP Fact Book, 1996). The Lumbee tribe makes up "roughly one-half the state of NC's Native American population" (Brooks, 1994) and "95% of the town of Pembroke in Robeson County" (WRAL – Online, 1997). A random survey of sixty-six Lumbee residents of Pembroke and surrounding communities revealed thirty-two non-diabetics verses thirty-four diabetic individuals ranging in age from 42 to 63. As you can see, the prevalence is over half for the responding population at 52 percent having NIDDM. This data is not an indication for the whole county; however, further studies could reveal the actual prevalence for Native Americans in Robeson County or more specific for Lumbees in Robeson and the surrounding counties.

Diabetes Treatment: Which method(s) is/are most effective?

The most important goal for treating diabetes is to maintain a blood glucose level within a normal range to prevent long-term complications from many years of high blood glucose (NIH, 1992).

- Diet

"In 1986, a National Institutes of Health panel of experts recommended that the best treatment for NIDDM is a diet that helps the person maintain normal weight" (NIH, 1992).

> 'The diet for all persons with NIDDM should be nutritionally sound, and it should satisfy the recommended dietary allowances (RDA) and follow the *Dietary Guidelines for Americans*' (Home and Garden Bulletin #232, 2nd Edition, Washington, D.C.: USDA and HHS, 1985) (NIH Consens, 1986).

"The primary dietary intervention is weight control" (NIH Consens, 1986). Experts recommended that 50 to 60 percent of daily calories come from carbohydrates, 12 to 20 percent from protein, and 30 percent or less from fat (NIH, 1992). "A new study suggests that diets rich in high-fiber foods – fruits, vegetables, beans, and whole grains – are associated with a lower risk of diabetes" (ADA, 1997). Overall, a diet of this kind will help reduce the risk of the main cause of death among diabetes is cardiovascular disease. A proper diabetic diet should achieve ideal weight, maintain normal blood glucose, and limit foods that contribute to heart disease (NIH, 1992).

- Exercise

In conjunction with the proper diet, regular exercise can help control diabetes. Exercise or any type of physical activity other than a person's job has numerous overall health benefits. An expert on exercise and diabetes at the University of Pittsburgh says any kind of exercise works, 'just start doing it regularly' (ADA, 1997). 'The biggest difference in who gets diabetes and who doesn't is between those who are inactive and those who do some physical activity – walking, dancing, gardening, bowling, hiking, -- anything really' (ADA, 1997). Exercise does burn calories, helping in weight loss, it can improve the body's response to insulin, and it reduces the risks for developing heart disease (NIH, 1992). However, the benefits received from exercise for individuals with NIDDM depends on their "physical capacity, preferences, age, and lifestyle" (NIH Consens, 1986). NIDDM patients should consult their physician before starting an exercise program. However walking is a great exercise for almost anyone, and it is easy to do. The sixty-six respondents from the surveys, most people diabetic and non-diabetic said they try to walk at least three to five times a week. Just remember that every individual is different therefore their response to exercise will also be different.

- Oral Medications and Insulin

"Oral diabetes medications may be used when diet and exercise alone do not control diabetes" (NIH, 1992). Although they are not insulin, they also are not a substitute for diet and exercise (NIH, 1992). Insulin is ultimately used when treatment with diet, exercise, and oral medications do not work (NIH, 1992). Insulin must be administered through injection, usually into muscle tissue. Therefore, weight control is very important when taking insulin. The severity of diabetes determines whether insulin or oral medications will be more effective in controlling blood glucose as well as considering one's age and weight (NIH, 1992). Oral medications are most effective in people age 40 and over, having been diagnosed less than five years, having normal weight, and never receiving insulin over 409 units a day. (NIH, 1992).

Table 1-1

RESPONDENT'S METHOD OF TREATMENT WITH MEDICATION		
	MALES - NIDDM	FEMALES - NIDDM
Insulin	46 %	31 %
Pills	54 %	69 %
TOTAL	**100 %**	**100 %**

Of the NIDDM respondents who indicated their method of treatment, using either insulin or oral medication, the majority uses oral medications at least twice a day. Of the overall combinations of treatment methods, according to Joyce Orban, R.N., a certified diabetes educator and Coordinator for the Community Diabetes Education Program for Robeson County, emphasizes three modalities for treatment – exercise and stress control, diet, and medication.
Most experts and health care professionals prescribe a treatment implementing all three. However, are patients compliant enough to realize the benefits from implememting all three as their prescribed method of treatment?

Patient Compliance: Are men or women more compliant to their prescribed method of treatment?

Table 1-2

DIET -- Fruits and Vegetables (Consumption at least 3-5 times a week)				
	MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES - NIDDM
Fruit	92 %	78 %	85 %	75 %
Salad	92 %	86 %	100 %	90 %
Vegetable	54 %	50 %	79 %	50 %
AVERAGE	**79 %**	**71 %**	**88 %**	**72 %**

Table 1-3

DIET -- Meat Consumption and Preparation				
	MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES - NIDDM
White Meat * Always	85 %	71 %	60 %	55 %
White Meat * Often	0 %	7 %	32 %	20 %
Red Meat ** Always	62 %	36 %	37 %	50 %
Red Meat ** Often	23 %	43 %	53 %	30 %
Meats, Always AVERAGE	**74 %**	**54 %**	**49 %**	**53 %**
Meats, Often AVERAGE	**12 %**	**25 %**	**43 %**	**25 %**

* Chicken or turkey, prepared by either frying or baking

** Beef or pork, prepared by either frying or baking

Table 1-4

DIET -- Fat and Fat Product Consumption				
	MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES - NIDDM
Fat Trimmed	0 %	0 %	0 %	10 %
Snack between Meals *	39 %	25 %	40 %	40 %
Vegetable Oil or margarine	85 %	86 %	79 %	75 %
AVERAGE	**41 %**	**37 %**	**40 %**	**42 %**

* Average of responses for "often" and "usually/always"

Table 1-5

AVERAGES FOR ALL DIETARY COMPONENTS				
	MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES – NIDDM
DIET: Fruits and Vegetables	79 %	71 %	88 %	72 %
DIET: Meat Consumption and Preparation	86 %	79 %	92 %	78 %
DIET: Fat and Fat Product Consumption	41 %	37 %	40%	42 %
AVERAGE	**69%**	**62%**	**73%**	**64%**

Data Summary:

- Diet

NIDDM - males and NIDDM - females average relatively the same for all dietary components. Neither is more compliant than the other is. Control - males and Control – females average slightly higher than NIDDM respondents do. Control respondents seem to be applying healthier dietary practices.

Table 1-6

PHYSICAL ACTIVITY (Average of a Minimum of 15-20 minutes Duration/day)				
	MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES – NIDDM
Daily	23 %	36 %	26 %	30 %
3-5 times/week	62 %	50 %	55 %	53 %
AVERAGE	**43 %**	**43 %**	**40 %**	**40 %**

Data Summary:

- Exercise

Again, neither males nor females show to be more compliant over the other. Control and NIDDM respondents are relatively the same.

Only one male responded as implementing diet and exercise using insulin as a prescribed treatment method. A ratio of 3 to 1 males to females implements diet and exercise taking oral medication. A 5 to 4 ratio implement diet only while taking oral medication, and a 1 to 1 ratio implement diet only while using insulin as their prescribed methods for treatment. Therefore, again showing no significant difference in compliance between males and females indicating diet and exercise as a part of their treatment. This data does support however the statement made by a local Physician Assistant who is diabetic, and participated in this study, saying that most patients think that by taking their medication, then it alone will control their diabetes.

Table 1-7

RESPONDENTS AFFECTED BY OTHER HEALTH PROBLEMS			
MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES – NIDDM
54 %	64 %	47 %	70 %

Table 1-8

ADVICE RECEIVED FROM RESPONDENT'S PHYSICIAN OR HEALTH CARE PROVIDER				
	MALES - Control	MALES - NIDDM	FEMALES- Control	FEMALES - NIDDM
[a] To Monitor Diet and Exercise*	16 %	64 %	27 %	45 %
[b] To Lose or Control Weight	0 %	50 %	0 %	50 %
AVERAGE	**8 %**	**57 %**	**14 %**	**48 %**

Most respondents were advised to do both (a).
Most diabetics were advised to do both (a) and (b).

Data Summary Overall:

Overall results show no significant data indicating a difference between the compliance of men and women, supporting the opinions of two local health care professionals stating that men and women are equally compliant. According to Ms. Orban, 90 percent of men and women are compliant after starting the educational program. However, more women tend to be "no shows" than men are. Therefore, this data does supply supporting evidence for the need of diabetes educational programs in Robeson County.

Diabetes Education:

When Southeastern Regional Medical Center was awarded $250,000 dollars from the Kate B. Reynolds Charitable Trust of Winston-Salem, funding for implementing a community Diabetes Education Program for the residents of Robeson County began (SRMC, Healthwise, 1999). Recognizing the high incidence for diabetes in Robeson County, a coalition of people from the Robeson County Health Department, Robeson Health Care Corporation, and Southeastern Regional Medical Center found the Diabetes Community Network under the Robeson county Partnership for Community Health (SRMC, Healthwise, 1999). According to the Health Care Division Grant Application, three major problems were described for Robeson County, which the program/project will address. The first problem addresses the "prevalence of complications" in comparisons to all other North Carolina counties. *(See Robeson County Statistics above).* "Lack of awareness" is the second problem, according to Robeson County health care professionals who feel this may be a contributory factor to such high incidence of complications (Black, Grant Application, 1998, p.2). Problem number three describes the "lack of self-management knowledge/skills". "Clinical observations at free community health screens revealed participants with known diabetes are severely limited in knowledge of self-care skills for managing their disease, and a lack of awareness that good diabetes control makes a difference in preventing complication" (Black, Grant Application, 1998, p.2). Finally on January 25th 1999 the Diabetes Community Center of Robeson County and Educational Program began (SRMC, Healthwise, Black, 1999). Designed to reach high risk individuals and improve the health of all Robeson County residents, this new program, as part of Southeastern Regional Medical Center Wellness Services provides the needed resources to anyone in Robeson County with any type of diabetes referred by a medical provider (Appendix IV, Brochure, 1999). Of the "multidisciplinary diabetes education team" the center is staffed by nurses certified in diabetes education, a registered dietitian, an exercise physiologist, a pharmacist, and a social worker (SRMC, Healthwise, Appendix IV, Brochure, 1999).

Providing patients with both group and individual sessions, the program also offers classes on "testing your blood sugar at home, healthy eating, effective use of medications, exercise, and preventing 'sugar highs and lows' (SRMC, Healthwise, 1999, p.8). As a plan of action, the Diabetes Community Center of Robeson County wants to "make the general population aware of the diabetes risk factors, keep local health care professions up-to-date on diabetes management techniques, and to establish a network of pharmacists who can advise patients and refer them to case managers" (Diabetes Community Network Brochure, 1999). This program is still building its patient population, and because it is so new, outside surveying for the purpose of this study was not allowed to prevent the discouragement of patient interaction.

(*Refer to Brochure Information Appendix IV*)

DISCUSSION

The initial aim for this study was quite broad in measuring treatment efficacy difference between races. This would have involved a much longer time period for collecting and analyzing data. Therefore after much thought and discussion with Dr. Velinda Woriax, faculty advisor for this project, the conclusion to narrow the population of study and maintain research on treatment efficacy difference between Native American men and women only, was determined. The hypothesis that diabetic women would be less compliant to their method of treatment opposed to diabetic men, developed from opinions that since women tend to be the central "care takers" of their homes and families, health issues concerning themselves are not a major priority. As this study began to unfold and surveys were collected, surprising responses from both men and women showed very little compliance in all the areas pertaining to diet and exercise as a means of treatment for controlling their diabetes. For example, many respondents indicated that they used either insulin or pills as medication and implemented diet and/or exercise as their overall method of treatment. However, in their individual response to specific questions about diet and exercise, over 50 percent were not compliant in reducing fat intake, increasing dietary fiber, and maintaining regular physical activity outside their jobs, according to their initial response. Therefore, unfortunately the hypothesis was not proven by these results, although more men did respond in explanation to the open-ended questions about individual improvement, possible contributory factors, and what lifestyle practices seem to help in controlling their blood sugar. Most respondents indicated heredity as the main contributory factor and most indicated improving their diet helps them to control their blood glucose level. This study overall was simply an informative and supportive tool containing raw data specific to Native American residents of Pembroke and its local communities. It is obvious that there is a problem with patient compliance, and further studies should be conducted as to where the problem actually lies.

By applying more specific questions, such as, 'Do you feel your diabetes is under control?' or, 'Are you overweight?' might have revealed more supporting evidence pertaining to Native Americans of Robeson County. Many new questions have derived from this study as to why the compliance is not better for diet and exercise among these, still young, vital, seemingly well educated, and socioeconomically stable individuals. Perhaps that is the problem. Diabetes does not have to be such an uncontrollable epidemic. Our society is advanced with the best of almost everything, yet we are probably one of the most unhealthy countries in the world. This study addresses many issues, concerning not only diabetes, but also improving our lifestyle to help prevent such chronic, seemingly preventable diseases. As similar studies are continually being performed and updated, I hope personally, as a student and a Native American with a family history of NIDDM, that what I have learned will enable me in the future to work to inform others about diabetes, and to help decrease the increasing prevalence in Robeson County.

APPENDIX I

Important Terms to Remember:

***Gestational Diabetes*:** Diabetes during pregnancy; usually disappears after the Pregnancy but can reoccur later in life as Type II

***Glucose*:** A simple, sugar product of digestion carried by the blood and used as the body's main source of energy (blood glucose)

***Hypoglycemia*:** Low blood glucose level below the normal 70mg/dl

***Hyperglycemia*:** High blood glucose level above the normal 140 mg/dl

IDDM: See definition for ***Type I Diabetes***

***Insulin*:** A hormone produced by the pancreas that enables the body's cells to use glucose

NIDDM: See definition for ***Type II Diabetes***

***Polyuria*:** Frequent urination; a typical symptom of diabetes

Type I Diabetes: Insulin – Dependent Diabetes Mellitus (Juvenile/Autoimmune Diabetes) (IDDM)

Type II Diabetes: Non – Insulin Dependent Diabetes Mellitus (Adult – Onset diabetes) (NIDDM)

APPENDIX II

The purpose of this survey is to study a random population of diabetic and non-diabetic Native Americans of Robeson County, between the ages of 45-60 years old, to ascertain how well men and women comply to their prescribed methods of treatment. This survey will also permit the analysis for a study of lifestyle modifications such as diet and exercise to determine if women are less compliant than men in treating their diabetic condition are.

CSP Thesis Research Project SURVEY:
PLEASE **DO NOT** WRITE YOUR NAME OR ANY TYPE IDENTIFICATION.

I. 1. How old are you? _____ years

1a. Gender: _____ Male _____ Female Race: _____

2. Has a doctor or nurse ever said that you have **DIABETES** ("*sugar diabetes*")
_____ yes _____ no *(if "no" skip to Question # 3.)*

2a. How old were you at the time? _____ years

2b. **WOMEN ONLY:** Were you pregnant at the time of diagnosis?
_____ yes _____ no

2c. How is your diabetes currently being treated? (*Check ALL that apply*)
_____ insulin _____ pills _____ diet _____ exercise _____ untreated

2d. Currently, how often do you use insulin or take pills for treatment?
(*Specify insulin or pills*)
#_____ times a day #_____ times a week _____ unsure/ Don't Know

Optional. How often do you or your health care provider check your blood sugar?
#_____ times a day #_____ times a week ____ occasionally/only when sick

3. Are you affected by any other heath conditions or problems? (E.g. High Blood Pressure, Cholesterol, Heart Disease, etc.)
_____ yes _____ no _____ unsure/DK

II. 1. Has a doctor or other health care professional ever talked to you about your diet or eating habits? IF YES, how long ago or how often?
_____ yes, at every check-up _____ yes, 1 to 12 months ago
_____ yes, 1 to 3 years ago _____ no/ Don't Know

2. Has a doctor or other health care professional ever talked to you about physical activity or exercise? IF YES, how long ago or how often?
_____ yes, at every check-up _____ yes, 1 to 12 months ago
_____ yes, 1 to 3 years ago _____ no/ Don't Know

3. How often do you eat fruit?
_____ everyday _____ 3-5 times a week _____ seldom to never _____ DK

3a. How often do you eat green salad?
_____ everyday _____ 3-5 times a week _____ seldom to never _____ DK

3b. How often do you eat cooked vegetables? (E.g.. corn, peas, beans, turnips, collards, squash, etc.)
_____everyday _____3-5 times a week _____seldom to never _____DK

4. Other than your routine job duties, how often do you participate in physical activities or exercises such as walking, biking, bowling, running, gardening, etc.
_____everyday _____3-5 times a week _____seldom to never _____DK

4a. What type of physical activity or exercises do you spend the most time doing other than your routine job duties? (*Please specify.*)

4b. How long do you usually spend or take part in this activity?
_____15-20 minutes _____30 min. to 1 hour _____ 1 or more _____DK

4c. What other physical activities or exercises do you participate in?
(*Please specify.*)

III. 1. How often do you eat chicken or turkey?
_____ usually/always _____often _____sometimes _____rarely/never
_____DK

1a. How was the chicken or turkey prepared?
_____ fried _____baked _____broiled _____ DK

2. How often do you eat red meat such as beef or pork?
_____ usually/always _____often _____sometimes _____rarely/never
_____DK

2a. Do you trim the fat off? _____ yes _____ no

3. How often do you eat between meals?
_____ usually/always _____often _____sometimes _____rarely/never
_____DK

4. What kind of fat products do you normally use when cooking?
(*Check ALL that apply*)
_____butter _____margarine _____vegetable oils _____Crisco/lard
_____cooking sprays _____DK

4a. Which product do you use the most?
_____butter _____margarine _____vegetable oils _____Crisco/lard
_____cooking sprays _____DK

Optional. Has a doctor, nurse, or other health professional ever given you advice about your weight concerning your diabetes?
_____ yes, lose weight _____yes, maintain/ control weight _____no/DK

5. How does your diet and exercise habits differ now, having diabetes than before? _____ No Change _____Improvement **Explain.**

6. What lifestyle habits, other than diet and lack of exercise do you feel may have contributed to having diabetes? **Explain**.
(*E.g.. genetics(inherited), stress, weight, other)*

7. Currently, what lifestyle habits do you practice that seems to improve/help control your diabetes? **Explain**. (E.g.. exercise, diet, weight control, other)

*DK=Don't Know
*Optional= Answer only if you want to.

APPENDIX III

Health Care Professionals -- Interview Questions:

1. Briefly describe the typical American lifestyle from a health care perspective?

2. Briefly describe the typical Native American lifestyle in Robeson County?

3. What are some of the major risk factors stemming from these lifestyles that lead to the development of diabetes?

4. How do most patients with diabetes view their condition? Do they feel responsible, or do they simply accept this as a change with age? Do they fear having diabetes?

5. What are some of the lifestyle changes you recommend for patients with diabetes? (E.g. dietary changes, exercise, etc.)

6. In your opinion, what are the best ways to control diabetes?

7. In your opinion, are there more women with diabetes than men? Are men more compliant than women to their method of treatment? Why?

8. In your opinion, are people with or without diabetes beginning to improve their lifestyles in order to prevent developing such diseases?

9. In your experience of working with Native Americans persons having diabetes, what do you think could be the leading cause among this group in Robeson County? (E.g. improper diet, lack of exercise, genetics, lack of health education, etc.)

APPENDIX IV

Diabetes Community Center of Robeson Public Announcement:
(See following page)

Diabetes Community Center of Robeson County
2300 Pine ST.
Lumberton, NC 28358

Robeson County ranks # 1 in Diabetes in the state of North Carolina

Robeson County ranks # 2 in Diabetes in the state of North Carolina in non-trauma amputations due to diabetes.

The Diabetes Community Center was formed by the Diabetes Community Network of Robeson County. This coalition is composed of people in the community concerned about diabetes, Robeson County Health Department, Robeson Health Care Corporation and the SouthEastern Regional Hospital.

Cost $5.00 per session, financial aid is available (No one will be turned away)

Phone # 910-618-0655 Toll free number 1-877-703-2680

Staff:
Certified Diabetes Educator – nurse
Registered Dietitian
Exercise Physiologist
Pharmacist
Social Worker

This program is opened to anyone in Robeson County with any type of diabetes. A medical provider referral in required. The center holds classes in how to manage your diabetes:

- Treatment of high and low blood sugar levels
- How to check your blood sugar with a meter
- How to take care of yourself when you are sick
- Complications
- Nutrition
- Exercise

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